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For a thriving New England

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Vermont Climate Council
Agriculture and Ecosystems Subcommittee
Rural Resilience and Adaptation Subcommittee
Via Public Input Form

Re: Initial Climate Action Plan Recommendations for Natural and Working Lands and the Built Environment

Dear Vermont Climate Council and Subcommittee Members:

Conservation Law Foundation respectfully submits the following initial recommendations for the Vermont's Climate Action Plan (CAP) for natural and working lands and the built environment. Vermont's Climate Action Plan is not just a statutory requirement. It is an opportunity for Vermont to create a thriving, resilient, and equitable future for all residents of the Green Mountain State as well as our land, water, fish, and wildlife. Our specific comments are set forth below.

Forest Protection and Restoration for Climate Mitigation and Carbon Storage

Forests are perhaps Vermont's greatest asset as we look to create a more resilient future. However, despite tree cover across nearly 80% of the state, Vermont's forests do not produce high levels of ecosystem services due to current management practices, including harvest frequency and intensity, and are still recovering from extensive clearing in the eighteenth and nineteenth centuries.[1] Recent studies demonstrate that old, wild forests and wetlands (i.e. passively managed) are the most resilient to changes in climate.[2] Such ecosystems preserve the greatest levels of biodiversity,[3] store more carbon,[4] mitigate against flooding and drought,[5] and remove higher levels of phosphorus than young or middle-aged forests.[6] Despite the clear scientific evidence for increased amounts of old, wild forest, only 3% of Vermont (and a similar amount across New England) is managed to protect biodiversity and natural processes without

[1] "Social and biophysical determinants of future forest conditions in New England, Effects of a modern land-use regime" (Duveneck and Thompson, 2019)
[2] "Climate sensitivity of ecosystem services and biodiversity in relation to forest age" (Thom et al, 2019)
[3] "The exceptional value of intact forest ecosystems" (Watson et al 2018)
[4] "Late-Successional Biomass Development in Northern Hardwood-Conifer Forests of the Northeastern United States" (Keeton et al, 2011)
[5] "Enhancing Flood Resiliency of Vermont State Lands" (Underwood and Brynn, 2015)
[6] "Forest Stream Interactions in Eastern Old-Growth Forests" in *Ecology and Recovery of Eastern Old Growth Forests* (Warren et al 2018)

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human intervention.[7] Today, Vermont's naturally occurring, pre-colonial forest is functionally absent from Vermont, comprising less than 1/10 of 1% of our state.[8] In comparison, more than 10% of New York's forests are managed to become old forests.[9]

In 2018, the Vermont Department of Fish and Wildlife released a vision for land management in the Green Mountain State, "Vermont Conservation Design," which sets a target of at least 9% of Vermont forests (and at least 15% of large forest blocks) to be managed as or to become old forests. More recently, the 30x30 Global Deal for Nature,[10] endorsed by the Biden Administration in Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, calls for 30% of lands and waters to be protected from extractive uses to maintain and restore biodiversity and store carbon. Research from UVM demonstrates that Vermont's forests could store two to four times more carbon than current levels if allowed to reach their full ecological potential.[11] State policies should shift more of Vermont's forests towards passive management to maximize production of ecosystem services.

In order to achieve the mandates of the Vermont Global Warming Solutions Act and protect and restore Vermont's forests, the Climate Action Plan should recommend:

- Prohibit the construction of new (or expansion of existing) large-scale industrial biomass facilities, and the Vermont carbon budget reflects an accurate accounting of existing facilities.
- Commit to protecting, by 2030, 30% of lands and waters from extractive uses to maintain and restore biodiversity and store carbon.
- Establish a system of wildlands on Vermont state lands focused on both passive restoration and preservation of intact ecosystems. As a part of the process for establishing wildlands, the Departments of Forest, Parks, and Recreation and Fish & Wildlife should be required to identify areas for designation in Long Range Management Plans based on Vermont Conservation Design, the State Hazard Mitigation Plan, relevant TMDLs, and other applicable state plans or regulations.
- Implement the action items listed in the State Hazard Mitigation Plan for protecting headwaters and improving headwater storage, which was identified as one of the top climate resilience priorities in the Plan.
- Update the Use Value Appraisal (Current Use) program to include an option for landowners to enroll their forests as wildlands in the same way that actively-managed forests may be enrolled, with or without a conservation easement on the land.

[7] "Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good" (Moomaw et al, 2019)

[8] "Vermont Conservation Design – Natural Community and Habitat Technical Report" (Zaino et al 2018)

[9] "Getting to 30x30: Guidelines for Decision-makers" (Rosa and Malcom, 2020)

[10] "A Global Deal for Nature: Guiding principles, milestones, and targets" (Dinerstein et al, 2019)

[11] Late-Successional Biomass Development in Northern Hardwood-Conifer Forests of the Northeastern United States" (Keeton et al, 2011)

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- Review and – where necessary – revise statutes governing state land management to reflect the latest science and public values re: ecosystem services and habitat restoration, and maximize public land contributions towards Vermont's greenhouse gas reduction mandates.

Wetland and Floodplain Protection and Restoration for Climate Resilience

Wetlands and floodplains are the unsung heroes of natural disaster mitigation, carbon storage, and restoration of biodiversity. Vermont has lost a significant portion of its floodplains and wetlands to development. Estimates are that wetlands have been reduced by half in the Champlain Basin, and by more than a third statewide.[12] Wetlands and floodplains provide critical environmental, public safety, and economic benefits. Because of this critical importance to people and the natural environment on which we depend, the goal of the state of Vermont must be the protection *and* restoration of wetlands and floodplains. Wetlands comprise just 4%[13] of Vermont's land area, yet they serve a variety of functions and values beneficial to the general public and to the environment, including flood resiliency,[14] water quality protection, wildlife and aquatic vegetation habitat, groundwater recharge, erosion control, carbon storage,[15]and recreational and educational opportunities.

Wetlands offer critical habitat for 35% of Vermont's threatened and endangered plant species and 21% of imperiled animals.[16] Restoring wetlands in the Vermont portion of the Lake Champlain Basin could achieve 15% of the pollution reduction goals required for the lake by the EPA.[17] A study by The Trust for Public Land found that for every state dollar invested in conservation of our forests and wetlands, $9 worth of natural goods and services is returned to Vermonters.[18]

In order to achieve the mandates of the Vermont Global Warming Solutions and protect and restore Vermont's wetlands and floodplains, the Climate Action Plan should recommend:

- A net gain of wetlands policy to increase Vermont's climate resilience, improve habitat, and to absorb atmospheric carbon.

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[12] "Lake Champlain Basin Program: Wetlands" (accessed 4/1/21)
[13] "Vermont Conservation Design: Habitat and Natural Communities Technical Report" (Zaino et al, 2018)
[14] "Quantifying flood mitigation services: The economic value of Otter Creek wetlands and floodplains to Middlebury, VT (Watson et al, 2016)
[15] "Wetlands in a changing climate: science, policy and management" (Moomaw et al, 2018)
[16] *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (E. Thompson, E. Sorenson, and R. Zaino, 2019)
[17] "Optimizing wetland restoration to improve water quality at a regional scale" (Singh et al, 2019)
[18] "Vermont's return on investment in land conservation" (Trust for Public Land, 2018)

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- A stronger mitigation requirement for individual wetland permits, to require restoration of a substantial predetermined ratio (minimum 2:1) of degraded wetlands, or the creation of new functional wetlands to achieve an overall gain of wetlands.
- The Vermont In-Lieu Fee compensation program for wetland impacts should require funds to be spent on in-state wetland restoration projects to ensure that mitigation fees contribute towards Vermont's restoration targets and not those of neighboring states.
- Updates to the Vermont Significant Wetlands Inventory (VSWI) and/or Wetland Advisory mapping layers both on the ANR Atlas and as a Shapefile on the Vermont Geodata Portal to more accurately depict the extent of wetlands in Vermont.
- Updates to the Class I wetland designation process to streamline the protection of the state's highest-functioning wetlands.
- Establish a Wetlands Scientific Advisory Committee to provide independent scientific advice to all Executive Branch Agencies on matters relating to wetlands protection, restoration, and creation.
- Create a new statewide permitting program in DEC to avoid or minimize new development in river corridors and riparian areas to reduce flood vulnerability on-site and downstream and maintain ecological function. ANR has found that protecting and establishing woody riparian areas is the most cost-effective strategy to protect and restore the ecological health of streams.
- Establish a statewide program to buy out, permanently conserve, and ecologically restore parcels with flood-prone structures with a particular emphasis on economically and historically disadvantaged populations. Develop incentives to move and develop disincentives to build structures in floodplains.
- Accelerate efforts to work with farmers to take flood-prone marginal agricultural land out of production and restore to native floodplain forest, with any necessary on-site hydrological restoration as well.
- Increase funding for river restoration projects to remove barriers and reconnect rivers to floodplains to access flood storage.

Regulation of the Built Environment for Climate Resilience

In light of the long life span of most infrastructure and buildings, it's essential to consider future climate conditions when designing and constructing new projects and updating existing facilities. Locating these projects out of harm's way and designing them to withstand the new conditions brought about by climate change are critical to ensuring that our built environment is resilient to the impact of climate change.

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State requirements must take into account, at a minimum, the increase in extreme precipitation events and associated flooding.[19] They should ensure that essential services such as electricity and wastewater treatment are resilient to the new conditions and that our drinking water is clean, treated, and healthy. State requirements should ensure that access to healthy drinking water is not impacted by the increase in extreme precipitation events and associated flooding, which can carry excess run-off into source water; increased temperatures, which can foster toxic cyanobacteria blooms, especially in surface water sources; and increased risk of short-term drought, which can concentrate contaminants in source water.[20]

Likewise, the flooding and fluvial erosion triggered by extreme precipitation events can impact our electric system in various ways. Within the state, the transmission of electricity may be affected by direct storm damage and/or flooding. For example, during Tropical Storm Irene roughly 50,000 Vermonters lost power, some for an extended period of time. Power outages were attributed to high winds impacting transmission lines, as well as flooding that put many lines under water and impacted substation equipment. Apart from the impact of extreme storm events on energy systems, generally warmer temperatures and associated changes will affect energy systems in various ways. Ice storms are likely to increase as a result of climate change, as Vermont's winter temperature fluctuates above and below freezing and more winter precipitation falls. Ice laden trees threaten power lines. Demand for electricity to run air conditioners on the hottest days will rise.

Simply put, more resilient systems and infrastructure are more equitable. Infrastructure failures, storm-related power outages, and related problems have the greatest impact on the most vulnerable populations, including those with medical conditions that require power for medical equipment or refrigeration for medicine. While the costs of implementation may be high, over time the costs of inaction will be even higher.

In order to achieve the mandates of the Vermont Global Warming Solutions Act and to improve the resilience of Vermont's built environment, protect its most vulnerable residents, and avoid the waste and carbon emissions associated with damaged infrastructure, the Climate Action Plan should recommend:

Strategies for Immediate Implementation:

- All state agencies, departments, boards, commissions, and authorities should be required to consider the foreseeable climate change impacts when considering and issuing permits, licenses, and other administrative approvals and decisions. All permit applications

[19] Fourth National Climate Assessment, Chapter 18, Northeast (2018). See also the State's Hazard Mitigation Plan (2018), which rates fluvial erosion and inundation flooding, both of which are increasingly likely in Vermont's changing climate, as the most significant risks we face in Vermont.

[20] Fourth National Climate Assessment, Chapter 14, Human Health (2018); Vermont Climate and Health Profile Report: Building Resilience against Climate Change in Vermont (VT Dept. of Health 2016), Section 3.5.

should require the applicant to disclose relevant climate risks and adaptation measures. Likewise, all applicants for state grants, loans, and other funding should be required to demonstrate that the planning and design of the project include adaptation measures that address foreseeable climate change impacts, as should all RFPs for state capital projects.

- The state should require all utilities to consider the long-term impacts of climate change on their infrastructure and service delivery, assess current and future vulnerabilities, and make and implement plans to address those risks, including building the necessary adaptation measures into long-term financial and capital plans. At a minimum, a vulnerability assessment and preparedness plan should identify the risks and impacts that climate change will have on the utility system and include measures such as undergrounding transmission and distribution lines, upgrading poles and structures, elevating substations and relocating facilities out of flood hazard areas.[21] To ensure the planning is effective and the implementation is equitable, the State should provide technical assistance as well as strategic capital budgeting training and materials, and should be prepared to provide financial assistance for implementation.
- The Agency of Natural Resources should modify the Water Supply Rule to require all public water systems to consider future flood risk and other risks of climate change as part of the mandatory Long Range Plan and/or Source Protection Plan.[22] Likewise, municipal wastewater systems should be required to identify their climate vulnerabilities and fund appropriate adaptive measures.[23] To ensure the planning is effective, the State should provide technical assistance to municipalities to assess the flood and erosion risks facing their drinking water and waste water systems and identify potential mitigation improvements, as proposed in the 2018 Hazard Mitigation Plan. Likewise, the state should provide strategic capital budgeting training and materials to incorporate mitigation and water quality projects, including a directive to explain the cost of no action and include municipal liability concerns, also as proposed in the 2018 Hazard Mitigation Plan. To ensure the planning is effective and the implementation is equitable, the State should provide technical assistance as well as strategic capital budgeting training and materials, and should be prepared to provide financial assistance for implementation.
- The Legislature should update Act 250 address climate resilience. In 2020, the legislature considered but did not pass a new criterion (9)(M), which would have provided as follows:

> (9)(M) Climate adaptation. A permit will be granted for the development or subdivision when it has been demonstrated that, in addition to all other applicable criteria, the development or subdivision will employ building orientation, site and

[21] Influence of extreme weather and climate change on the resilience of power systems: Impacts and possible mitigation strategies, Mathaios Pantelia and Pierluigi Mancarella, Electric Power Systems Research, 2015.
[22] Water Supply Rule (2019) (See Section 16.2 (Components of a Source Protection Plan); Appendix B (Long Range Plan Requirements)).
[23] See, e.g., Resilient Rhody, An Actionable Vision for Addressing the Impacts of Climate Change in Rhode Island (2018), p. 22.

landscape design, and building design that are sufficient to enable the improvements to be sited and constructed, including buildings, roads, and other infrastructure, to withstand and adapt to the effects of climate change, including extreme temperature events, wind, and precipitation reasonably projected at the time of application.[24]

Longer-Term Strategies:

- The State should update the definition of Flood Hazard Area in the Wastewater System and Potable Water Supply Rules, the Flood Hazard Area and River Corridor Rule, and the state's Building Code. To qualify for participation in FEMA's National Flood Insurance Program ("NFIP"), Vermont has adopted definitions and regulations for "flood hazard area" and "floodway"[25] based on FEMA's 100-year flood standard.[26] However, recent data and trends make clear that the historic 100-year flood is now much frequent than a theoretical 1% chance event.[27] FEMA's methodology, which is based on historic averages, doesn't take into account the increase in precipitation and extreme precipitation events caused by global warming, nor does it consider fluvial erosion hazards. It is also based on outdated hydraulic modeling. Recent work indicates that FEMA's methodology fails to identify more than 2/3 of the Vermont properties that actually have a 1% flood risk.[28] A new, more resilient, definition should include forward-looking climate projections, not solely historic data, and should include fluvial erosion risks in addition to inundation risks. The updated definition should allow municipalities to substitute local data to expand the delineation of the floodplain.
- The Department of Public Safety, in consultation with the Agency of Natural Resources, should update the Building Code with scientifically sound treatments of flood-resistant construction standards, snow loads, frost protection, and adequate ventilation or cooling standards, to ensure that any new construction is appropriate not only for Vermont's past and present climate, but for the climate we anticipate over the typical lifespan of residential, commercial, and industrial structures. The State should also adapt these

[24] House Bill 926 (2020).
[25] See, e.g., 10 V.S.A. Chapter 32 (Flood Hazard Areas), § 752; 10 V.S.A. Chapter 49 (Protection of Navigable Waters and Shorelands), § 1422; 24 V.S.A. Chapter 117 (Municipal and Regional Planning and Development), § 4303; Vermont Flood Hazard Area and River Corridor Rule, adopted 10/24/15, effective 3/1/15; Vermont Flood Hazard Area and River Corridor Protection Procedure (9/7/2017, DEC).
[26] 44 CFR Part 60, sec. 60.2. FEMA allows communities to request that FEMA modify its maps (44 CFR Part 65). FEMA also offers a Cooperating Technical Partners (CTP) Program that allows communities or state agencies to "become active partners" in FEMA's Flood Hazard Mapping. However, neither of these opportunities allows states or communities to use forward-looking data, including the increased risk of extreme precipitation events, or consider fluvial (erosion) hazards in addition to flood (inundation) hazards.
[27] US Climate Resilience Toolkit: Inland Flooding. First Street Foundation, First National Flood Risk Assessment (2020). See also Climate change exacerbates hurricane flood hazards along US Atlantic and Gulf Coasts in spatially varying patterns, R. Marsooli, N. Lin et al., Nature Communications (2019).
[28] First Street Foundation, First National Flood Risk Assessment (2020), p. 144.

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standards into model bylaws for use by municipalities, so that they would apply to construction that isn't covered by the Building Code.

- The state should modify the definition of "failed [septic] system" in the Wastewater System and Potable Water Supply Rules and establish a more robust system authorizing septic system inspections, to allow for more proactive responses to systems that are not adequately treating septage. The state should also require mandatory periodic pumping of septic tanks, periodic mandatory inspections, and/or septic system inspections at the time of sale of a property.

We look forward to discussing these recommendations with you and appreciate your work on behalf of the State. Please do not hesitate to reach out with questions.

Thanks for your thoughtful consideration,

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